

to said light source;

 said light source further including a light emitting diode element;

 said light emitting diode element coincident with a reference axis;

 said light emitting diode element emitting light diverging about said reference axis;

 a refractive means;

 a reflective means, said reflective means reflecting and thereby directing said light to converge towards a light concentration point exterior to said reference axis and to intersect said refractive means whereat said light is refracted and thereby redirected; whereby,

 said reflective means and said refractive means cooperate to bring said light towards parallelism with said reference axis.

2. A lighting device including:

 a light source including a means to apply electrical power to said light source;

 said light source further including a light emitting diode element;

 said light emitting diode element coincident with a reference axis;

 said reference axis coincident with a reference plane;

 said light emitting diode element emitting first side light diverging about said reference axis and diverging about a first side of said reference plane;

 a refractive means;

 a reflective means, said reflective means reflecting and thereby directing said first side light to converge towards a light concentration point exterior to said reference plane and to intersect said refractive means whereat said first side light is refracted and thereby redirected;

 said light emitting diode element further emitting second side light diverging about said reference axis and diverging about a second side of said reference plane;

said reflective means further reflecting and thereby directing said second side light to converge towards a light concentration point exterior to said reference axis and to intersect said refractive means whereat said second side light is refracted and thereby redirected; whereby,

said reflective means and said refractive means cooperate to bring said first side light towards parallelism with said reference axis, said reflective means and said refractive means further cooperate to bring said second side light towards parallelism with said reference axis.

3. A lighting device including:

a light source including a means to apply electrical power to said light source;

said light source further including a light emitting diode element;

said light emitting diode element coincident with a reference axis;

said light emitting diode element emitting light diverging about said reference axis;

a refractive means;

a reflective means;

a light transmitting medium with an index of refraction exceeding 1.1 forming said reflective means, forming said refractive means and encapsulating said light emitting diode element;

said reflective means reflecting and thereby directing said side light to converge towards a light concentration point exterior to said reference axis and to intersect said refractive means whereat said light is refracted and thereby redirected; whereby,

said reflective means and said refractive means cooperate to bring said light towards parallelism with said reference axis.

4. A lighting device including:

a light source including a means to apply electrical power to said light source;

said light source further including a light emitting diode element;

said light emitting diode element coincident with a reference axis and emitting forward light diverging about said reference axis;

a lens;

said lens refracting and thereby directing said forward light to bring said forward light towards parallelism with said reference axis;

said light emitting diode element further emitting side light diverging about said reference axis;

a refractive means;

a reflective means, said reflective means reflecting and thereby directing said side light to converge towards a light concentration point exterior to said reference axis and to intersect said refractive means whereat said light is refracted and thereby redirected; whereby,

said reflective means and said refractive means cooperate to bring said side light towards parallelism with said reference axis.

5. A lighting device including:

a light source including a means to apply electrical power to said light source;

said light source further including a light emitting diode element;

said light emitting diode element coincident with a reference axis;

said light emitting diode element emitting light diverging about said reference axis;

a refractive means;

a reflective means;

a sleeve means formed of a sleeve light transmitting medium;

said sleeve means comprising said refractive means and said reflective means, said sleeve means further comprising a wall forming a hollow portion, said hollow portion receiving said light source;

said reflective means reflecting and thereby directing said side light to converge towards a light concentration point

exterior to said reference axis and to intersect said refractive means whereat said light is refracted and thereby redirected; whereby,

said reflective means and said refractive means cooperate to bring said side light towards parallelism with said reference axis.

6. A lighting device including:

a light source including a means to apply electrical power to said light source;

said light source further including a light emitting diode element;

said light emitting diode element coincident with a reference axis;

said light emitting diode element emitting side light diverging about said reference axis;

a refractive means;

a reflective means;

said reflective means comprising a reflective surface, said reflective surface developed by rotating a curved line about said reference axis;

said reflective means reflecting and thereby directing said side light to converge towards a light concentration point exterior to said reference axis and to intersect said refractive means whereat said side light is refracted and thereby redirected; whereby,

said reflective means and said refractive means cooperate to bring said side light towards parallelism with said reference axis.

7. The lighting device as in any one of claims 1,2,3,5 or 6 which further includes;

a lens;

said light emitting diode element further emitting forward light diverging about said reference axis, said lens refracting and directing said forward light thereby reducing the divergence of said forward light about said reference axis.

8. The lighting device as in any one of claims 1,2,4 or 6 which further includes:

a sleeve means formed of a sleeve light transmitting medium; said sleeve means comprising said refractive means and said reflective means, said sleeve means further comprising a wall forming a hollow portion, said hollow portion receiving said light source.

9. The lighting device as in any one of claims 1,2 or 6 which further includes:

said light emitting diode element further emitting forward light diverging about said reference axis;

a lens for refracting and directing said forward light thereby reducing the divergence of said forward light about said reference axis;

a sleeve means constructed from a sleeve light transmitting medium;

said sleeve means comprising said refractive means and said reflective means, said sleeve means further comprising a wall forming a hollow portion, said hollow portion receiving said light source; and,

a wall light transmitting medium with an index of refraction exceeding 1.1 between said wall and said light source.

10. A lighting device as in any one of claims 1,2,4,5 or 6 which further includes:

a light transmitting medium with an index of refraction exceeding 1.1 forming said reflective means, forming said refractive means and encapsulating said light emitting diode element.

11. A lighting device as in any one of claims 1-6 which further comprises:

said reflective means comprising a reflective surface, said reflective surface developed by rotating a curved line about said reference axis; and

said refractive means comprising a refractive surface, said reflective surface developed by rotating a curved line about said reference axis.

12. The lighting device as in any one of claims 1-5 which further includes:

said reflective means comprising a reflective surface, said

reflective surface metallized with a reflective coating.

13. The lighting device as in any one of claims 1-5 which further includes:

said reflective means comprising a reflective surface, said reflective surface developed by rotating a curved line about said reference axis.

14. The lighting device as in any one of claims 1-5 which further includes:

said reflective means comprising a reflective surface, said reflective surface developed by rotating an elliptical line about parallel to said reference axis, said elliptical line developed about a first focal point and a second focal point, an elliptical line axis passing through said first focal point and said second focal point, said elliptical line axis upon being infinitely extended intersecting said reference axis and forming an acute included angle.

15. The lighting device as in any one of claims 1-5 which further includes:

said reflective means comprising a reflective surface, said reflective surface developed by rotating an elliptical line about said reference axis, said elliptical line developed about a first focal point and a second focal point, an elliptical line axis passing through said first focal point and said second focal point, said elliptical line axis upon being infinitely extended intersecting said reference axis, said first focal point approximately coincident with said reference axis.

16. A lighting device as in any one of claims 1-5 wherein:

said reflective means comprising a reflective surface; and,

said reference axis between said light concentration point and said reflective means.

17. The lighting device as in any one of claims 1-6 which further includes:

said refractive means comprising a reflective surface; and,

said refractive surface further comprising a concave surface.

18. The lighting device as in any one of claims 1-6 which further includes:

said refractive means comprising a reflective surface; and,
said reflective surface further comprising a spheroidal
surface.

19. A lighting device as in any one of claims 1-6 which further
includes:

said refractive means comprising a reflective surface; and,
said reflective surface developed by rotating a bent line
about said reference axis.

20. A lighting device according to any of claims 1 thru 6 which
further includes:

said refractive means comprising a reflective surface; and,
said reflective surface developed by rotating a bent line
about said reference axis.

21. A lighting device as in any one of claims 1-6 which further
includes:

said refractive means comprising a refractive surface; and,
said refractive surface developed by rotating a bent line
about said reference axis.

22. A lighting device as in any one of claims 1-6 which further
includes:

said light emitting diode element emitting light with a
spatial radiation pattern that includes a pattern axis; and,
said pattern axis substantially coincident with said refer-
ence axis.

A₁₆ >

A'

A₁₇ >
B₂